

## FUNDING AND REPAYMENT MANAGEMENT OF PV SYSTEM DISSEMINATION IN SRI LANKA II

By Lalith A. Gunaratne, Rural Energy Consultant

### Background

It has been two years since the first paper was written in October 1996 for the CDG Specialized Seminar “Financing Models of Decentralized Photovoltaic Energy Systems” held in Jakarta, Indonesia in November 1996. Many developments have taken place in Sri Lanka since then.

These developments hinge on the World Bank and the Sri Lankan government funded “Energy Services Delivery Project” (ESD). Apart from funds for other renewables, this fund has allocated finances for the installation of 30,000 SHS in the next five years through the private sector. The ESD was established in 1996. With the fund in place solar PV’s role as a technology for off-grid electrification will be tested.

Currently, there are four solar home system (SHS) project developers in the market, with a few on the sidelines. However, less than 10% of the allocated funds have yet moved.

Why has the fund not moved faster in the last two years?

The answer lies in the fact that - lack of funds is not the only barrier for successful SHS dissemination, albeit a major one. Now that funds are available, and in this case with a US \$ 100 per SHS GEF grant, one of the most important issues, being financing, is being addressed.

*However, this does not take away the fundamental issues such as:*

- the market is far away in remote areas of the country
- cost of doing business in rural areas is high
- the cost of SHS is relatively high for the target rural market
- the urban based banking system is uncomfortable lending in rural areas or for rural projects
- PV technology is relatively new to the financial institutions, policy makers and the market

The ESD funds coming in at the top creates pressure in the system of dissemination and all the above issues are being forced to be dealt with.

The next few years, Sri Lanka will be one of the places to watch as these unfold.

### Introduction

Sri Lankan solar home system (SHS) market is estimated to be over 200,000. These are rural households not linked to the Ceylon Electricity Board (CEB) grid and earning more than US \$ 100 per month. However, over the last 10 years less than 6000 systems have been sold. The one of the main reasons for this has been the lack of effective financing schemes for end users. The local SHS promoters lacked resources to offer credit themselves. Further, the existing mainstream financing institutions shied away from lending in rural areas for SHS.

However, the situation is changing with the recent establishment of the Energy Services Delivery (ESD) project, a joint Sri Lankan government - World Bank fund of US \$ 55 million for the dissemination of renewable energy for rural areas of the country. Out of this, US \$ 10 million is allocated for SHS. This paper will examine how the ESD has effected the market development of SHS so far.

## 1. A Brief History of Financing SHS

SHS dissemination in Sri Lanka began with a pilot effort by the utility, the Ceylon Electricity Board, selling systems out of its head office in the capital of Colombo in 1986. Over 700 SHS were sold for cash in two years. This fact followed by an extensive market and feasibility study prompted the author and the partners to establish Power & Sun (Pvt.) Limited (now called Solar Power & Light Company Limited) in 1988.

From the inception, the need for an effective credit scheme was well known. An investment of over US \$ 200 for an average rural dweller who earned less than US \$ 50 per month was deemed difficult. Power & Sun lobbied the government owned People's Bank (with an extensive network of branches in the rural regions) to establish a loan scheme.

On paper, the People's Bank scheme, which was established in 1989, showed much promise. However, in reality, except for a few branch managers who gave a total of about 40 loans, the scheme was not promoted effectively.

There was branch level apathy towards giving small loans to individuals. Further, the worry of a new technology compounded the lack of interest. A common concern among managers was the recourse available to them if the loan was defaulted. How and what to repossess in that event was not understood.

Nevertheless, Power & Sun continued to sell most of the SHS for cash through the rural dealer network.

However, there were certain dealers who operated their own informal credit programs. These dealers provided credit to only well known clients at interest rates of up to 48% per annum when the regular lending rates were between 20-25% per annum. Therefore, only a handful of such loans have been given.

In 1990, government embarked on aid assisted SHS project. The Pansiyagama 1000 Home Project was promoted by Sunpower Systems (another local company developing the institutional solar PV market) and BP Solar Australia using Australian aid and Sri Lankan government funds. The National Housing Development Authority (NHDA) administered the project. Power & Sun was subcontracted to assemble the BP modules in Sri Lanka.

Unfortunately, the "top down" nature of this project created a situation where bureaucracy and politics entangled with technology and financing. The end result was a project where the end users were not paying the low monthly payment. Close examination showed that the project did not involve the community in the planning and implementation process. The SHS were installed at give-away prices and monthly payments. The technical service was poorly administered as well as collection of repayments.

Overall, the project provided valuable lessons to all stakeholders. Technically, most of the SHS in Pansiyagama yet operate satisfactorily. It is now reported that the repayment rate is about 50% as it is too costly to follow-up and recover from all the users.

In 1990, two non-governmental organizations (NGOs), Sarvodaya and Solanka embarked on community based programs to install systems in selected areas. These projects used seed funds facilitated by the Solar Electric Light Fund of USA and Rotary International. Sarvodaya has installed over 250 systems and Solanka, over 100 systems with these funds.

Both these projects demonstrated successful SHS dissemination when the process links the technology with financing at the community level. This typical "bottom-up" approach empowered the rural community to understand the technology as well as manage the micro credit programs.

These serve as effective models. However, grant funds have been limited to sustain these types of projects and both Sarvodaya and Solanka have evolved to utilize commercial funds for SHS dissemination.

Sarvodaya was selected by the World Bank to install 300 SHS as the ESD pilot project. It has taken them well over 18 months to install 150 SHS, but this slow rate of installation has been due to a combination of external and in-

ternal issues for which Sarvodaya had little control over. At the moment Sarvodaya is developing an ambitious program to install 6000 SHS in 5 years. Sarvodaya has the infrastructure to achieve this through their existing rural credit network that provides loans mostly for agriculture.

Solanka has evolved into a private company called RESCO, a subsidiary of SELCO-USA. RESCO has already accessed funds to install 1000 SHS within 1998/9 period and is creating the rural level infrastructure to be a one stop shop for SHS in selected rural regions. This approach is consumer marketing oriented and the model is developed in a manner where franchise type standard operations can be established around the country as the business expands. The SHS will be marketed in a combination of cash sales, leasing and fee for service methods.

The fee for service concept will be, especially interesting to observe developing as it minimizes the risk to the end user.

Other private sector developers are also entering the SHS market to take advantage of the ESD credit line.

However, the most interesting development with the ESD project is attracting the mainstream financing institutions to the SHS business.

## **2. The Energy Services Delivery Project**

Ms. Loretta Schaeffer, Program Manager of the Asia Alternative Energy Unit of the World Bank is quoted to have said on Sri Lanka at the Solar Energy Forum - Soltech 93 - held on 28th April 1993 in Washington D.C.: 'the Bank may get involved in providing PV-powered household systems throughout the country as there is a strong private sector involvement and use of proven local experience in systems design, development, installation, operation and maintenance'.

This was a justification for the World Bank to examine establishing a fund in Sri Lanka to support SHS dissemination.

The Energy Services Delivery Fund was established in August 1997 with the Sri Lankan government, private sector and the World Bank contributing to make a total of US \$ 55 million.

### **2.1 The Objective of the ESD**

The broad objective is to promote the provision by the private sector, NGOs and co-operatives of grid connected and off-grid energy services using environmentally sustainable renewable energy technologies.

### **2.2 The Loans**

The loans will be made available to private sector firms, non governmental organizations, village co-operatives or any other non government project developer.

*The funds can be used for the following;*

- grid connected mini hydros
- off-grid village hydros
- solar home systems
- wind power, biomass and other renewables

The funds are channeled to the project developers through mainstream commercial lending institutions which are private commercial banks. These are called Participating Credit Institutions (PCIs).

### 2.3 How the ESD Project Works - The Conceptualized Ideal Scenario

The fund is activated when a project developer (PD) requests for funds with a bankable proposal to the PCI.

The PD could be a private company, a NGO or a rural level cooperative.

The PD would have conceptualized a project after assessing the electricity needs of an off-grid community.

The assessment would be based on financial viability of installing a projected number of SHS in the given community.

<b>The role of the project developer (PD);</b>
<ul style="list-style-type: none"><li>• assess the market potential</li><li>• possess technical capability to design, install and service SHS</li><li>• provide consumer financing</li><li>• market and promote SHS and financing scheme</li><li>• develop a bankable proposal based on the market potential and project feasibility</li><li>• negotiate with the PCI</li><li>• implement the project</li><li>• secure the GEF grant with follow-up documentation</li><li>• monitor the project</li><li>• repay the PCI</li></ul>

The above would be an ongoing process as a business venture.

A key component of the venture would be financing of the customer. The Business Plan would include the methodology of financing the customer as well as factor in the infrastructure costs for an in-house financing unit. This unit would assess potential customers, provide the loan to eligible people, and ensure that a system is in place for collecting the repayment. It should also have clear guidelines for recourse in case of loan default.

The other component is to cost the infrastructure that is required to market SHS and for the technical capability to install SHS that would meet the customer's need satisfactorily.

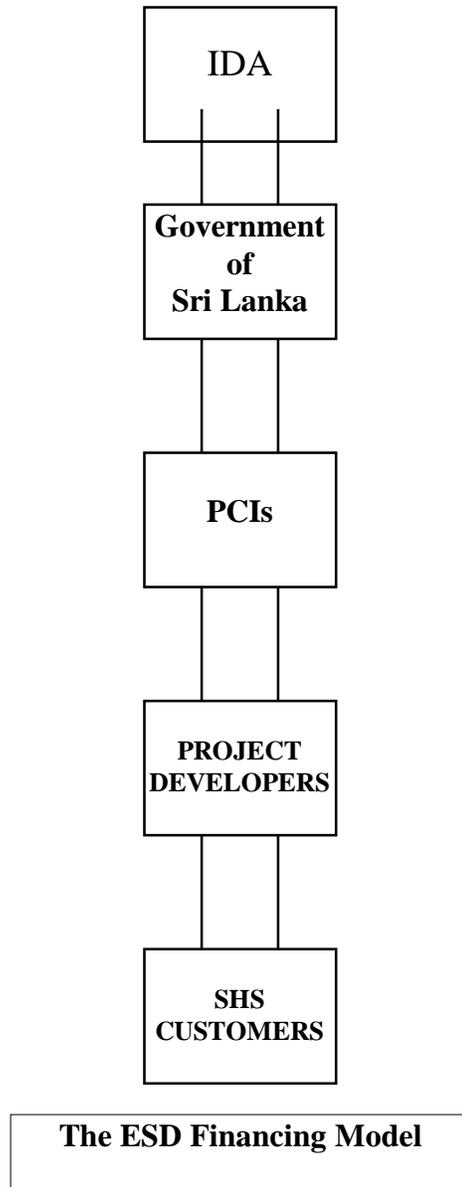
As the customer's monthly repayment is hinged to the system operating satisfactorily, the PD has to ensure that the after sales service capability is to a high standard. Ideally, it should be linked to the collection mechanism of the repayments. All these components have to be factored into the proposal.

The PD would be either one organization or a combination of organizations that bring together the specialized expertise in technical, marketing, and financing in order to develop the SHS market.

Finally, if the project proposal shows a positive return on the investment, the PCIs will entertain it. However, the proposal's viability has to be supported with collateral from the PD as with any company getting a loan from a bank. Once the PD gets the funds from the PCI, it can commence the business of developing the SHS market.

### 2.5 Getting the Funds to the Customer

The PD would promote SHS and the finance scheme to potential customers. Customers would present themselves and their electricity needs to the PD. If the customer requires financing, the process to evaluate and finance the customer will commence. Once the necessarily documentation is completed for financing, the SHS would be installed and PD - Customer relationship commences.



## 2.6 Making the ESD Project Work

The above is the how the ESD is designed to operate. However, this ideal situation is difficult to realize in reality for several reasons. First of there is a variety of entities who are potential project developers.

### *Types of project developers;*

- a) Private sector SHS vendors (i.e. Alpha Thermal Systems, Solar Power & Light Company)
- b) Non governmental organizations (i.e. Sarvodaya)
- c) Energy service companies (i.e. RESCO)
- d) Rural cooperatives and banks (Thrift and Credit Cooperatives - SANASA)
- e) Private Finance companies (i.e. The Finance Company)
- f) Private consortiums
- g) PCIs \*\* (i.e. Hatton National Bank)

### **a) Private Sector SHS Vendors**

These are companies that are importing and selling solar PV systems. These developers have their strengths in the technical, marketing and after sales areas. However, they do not have the expertise to provide financing to end-users. Therefore, if they are to access the ESD credit line to install large numbers of SHS, it is best to do so in partnership with organizations that have rural lending expertise and preferably, the infrastructure.

However, these partnerships are difficult to create due to the different operating cultures. For instance, entities involved in rural lending are generally non-governmental organizations or co-operatives like Sarvodaya and Thrift and Credit Cooperatives.

Nevertheless, companies such as Solar Power & Light Company (formerly Power & Sun) and Alpha Thermal Systems have been borrowing small amounts from the PCIs to install manageable numbers of SHS in a few areas.

For instance, Solar Power & Light Company as a project developer has borrowed ESD funds to install 150 SHS since June 1997. The company has been installing SHS in partnership with its dealers in the regions. Here, the dealers take the company one step closer to the customers. The collection of repayments are, however, proving to be difficult as the company is not geared for that.

Alpha Thermal has installed 100 SHS with ESD funds and they are also having problems in collecting the repayments from many of the customers.

#### ***Following are typical steps in the private project developer process (i.e. Solar Power & Light);***

- Dealer and an agent would identify a number of potential customers in an area.
- Company then provides the dealer with credit for the hardware based on a guarantee for one year.
- Dealer in turn lends to the customer for up to one year.
- SHS is installed by the company using its technicians and ensures after sales service
- collection of repayments are done by dealer but in cooperation with the technician

Therefore, with the dealer in the middle, the lending risk is minimized somewhat.

#### ***However, this method is difficult to practice on a consistent basis for the following reasons;***

- commitment to SHS and lending varies from dealer to dealer (not every dealer likes financing)
- varying levels of capability of dealers to market and finance SHS
- lack of a universal system to market SHS with financing makes it difficult to develop an islandwide program

There are other opportunities for these companies where they could create partnerships with, for instance, plantations companies. They could apply for ESD funds jointly to provide lighting for plantation employees who live in remote areas. These are being explored.

However, the linking with existing NGOs doing micro credit in rural areas would provide a strategic advantage to private project developers. They would have the specialized expertise in the technology and marketing and the NGO has its focus on financing.

### **b) Community Based Non Governmental Organizations**

There are many small NGOs scattered around Sri Lanka who have effective micro credit programs. These are regionally based and focused organizations with community involvement. These could become involved in rural lending for SHS as long as they create partnerships with organizations that specialize in the dissemination of the SHS technology.

However, there are not many NGOs in Sri Lanka that serve all corners of the country. There are also not many NGOs that have diverse capabilities to provide financing in rural areas as well as have the capacity to promote a technology such as solar PV. Sarvodaya Shramadana Society is an exception.

Sarvodaya is one of the largest NGOs in Sri Lanka. It has an extensive rural network and is involved in social, educational, health care, agricultural, financial and energy related activities.

Sarvodaya Rural Technical Services, the technical division of Sarvodaya, has been involved in SHS since its initial demonstration projects with the Solar Electric Light Fund (SELF) of USA.

The other advantage Sarvodaya has is its rural lending program administered by the Rural Enterprises Program (REPS). Through its village level organizations, which are managed by the people themselves, micro credit is provided for agriculture, home improvement and small businesses.

The initial SELF seed funded project acted as a pilot project utilizing the existing infrastructure to lend to SHS customers.

The World Bank's Asia Alternative Energy Unit (ASTAE) subsequently selected Sarvodaya to do the ESD pilot project for 300 SHS in February 1997. Here, two divisions within Sarvodaya coordinate to implement the SHS project. The Rural Enterprises Program (REPS) deals with the PCI to secure the funding. SRTS markets, installs and services the SHS. Both SRTS and REPS ensure that the repayments are made in time.

Currently, 150 SHS has been installed. The slow progress is due to several factors which have been beyond the control of the implementors of the project. (One problem stemmed from political influence which was enabling the grid to be extended or at least promises to be made in the same area the SHS project was targeted in. A different project area has been selected since)

Nevertheless, Sarvodaya is one organization, due to the extent of its developed rural infrastructure, that has the potential to market a large number of SHS in Sri Lanka. This would be possible once it gets further technical and marketing capability to do so.

Also, the social oriented culture of Sarvodaya is changing to keep up with the demands of the modern economic systems. Therefore, Sarvodaya as an organization is moving towards more sustainable commercial areas. Therefore, the SHS business fits well into the new emerging culture of Sarvodaya.

<p><b>The Sarvodaya SHS project operates in the following manner;</b></p> <ul style="list-style-type: none"><li>• SRTS and REPS identify a project area</li><li>• Develop the bankable proposal for PCI</li><li>• REPS negotiates with PCI and accesses ESD Fund</li><li>• SRTS/REPS establish area Solar Office</li><li>• SRTS officers markets, install and service SHS in the area</li><li>• REPS officers evaluates the customers for financing, finances and collects repayments</li><li>• REPS repays ESD loan to PCI</li></ul>
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Apart from Sarvodaya, a few NGOs are interested in the energy area.

With the planned marketing campaign for the ESD project, such organizations are expected emerge to access the fund to install SHS and other renewables at varying levels.

### c) Energy Service Companies (ESC)

The concept of energy service can be defined as “fee for the service for electricity”, just as the utility provides from the grid.

However, in the case of SHS, the system will be installed in a household, but it will belong to the ESC. The customer will pay a monthly fee for the service, in this case based on the system size.

The ESC has to focus in areas where the rural households are relatively closely located in order to provide the service economically.

The ESC would have the infrastructure to have a “one stop shop” for the service. For instance, a customer from the ESC operational area could sign a contract with the ESC to receive a stipulated number of watts or watt/hrs of electricity in the . The SHS would be installed after this.

This methodology is the ultimate in minimizing the risk to the end user.

***However, the risk to the ESC escalates in the following areas;***

- the SHS hardware is ESC’s responsibility, but the way it is used or abused is out of its control
- dispersed nature of the rural population creates logistical problems in managing client base (maintaining SHS and collecting payments)

However, RESCO is a Sri Lankan company and a part of the SELCO-USA network which will practice this concept as a portion of their business. RESCO has already accessed the ESD to install 1000 SHS and part of the funds will be used to lend to end users and the other part to operate as an ESC.

This will be an interesting model to monitor as it develops.

#### **d) Rural Cooperatives and Banks**

Rural cooperatives are an ideal mechanism to provide financing to SHS customers. Most of these organizations are managed and operated by the community themselves.

However, the quantum of money that is lent in micro credit programs are typically low as the focus is agriculture for farmers to purchase fertilizer and seed. (For larger quantum of borrowings, for instance for tractors etc. the farmers have to deal with either commercial banks or private finance companies which are located in regional centers.)

The most prominent specialized rural lending organization is the Thrift and Credit Cooperative (or SANASA which is the better known acronym in Sinhala). This movement was established in 1906 and now boasts over 7 million member households. The organization has three tiers, being the village co-operative, regional centers and the country level federation. The unique feature of SANASA is the autonomy the village level cooperatives have in its operation. All the savings that is collected also only get utilized in the village, except for the membership fees for the federation. The federation, in turn provides the financial management systems, training and other infrastructural inputs.

Further, the federation brokers various outside project funds that maybe relevant for utilization in rural areas. The ESD may have a role to finance SHS through the SANASA system.

The latest development with SANASA is the establishment of the SANASA Development Bank which is now even a more legitimate entity to access the ESD funds even as a PCI.

Discussions have just got underway to develop these areas between SANASA and the Administration Unit of the ESD, the DFCC Bank of Sri Lanka.

Various partnerships between SHS vendors and project developers can be envisioned when SANASA has access to ESD funds either directly or indirectly.

There are other rural banks that are emerging and these also have the potential to lend for SHS.

When the national awareness campaign commences, it will become easier to convince these rural bankers as well as others that Solar PV has an effective role in the rural energy mix.

#### **e) Private Finance Companies**

Several private finance companies have been operating in Sri Lanka for the last 25 years. Most of these concentrate on vehicle and land sales. One company, The Finance Company (TFC), however, has a strong presence in rural areas financing consumer goods. TFC has an extensive regional network and operates with extension officers to remote regions. Currently, TFC continues to finance SHS through the local dealers of Solar Power & Light Company. Ironically, the TFC financing of SHS does not have the sanction of the head office and the decision to finance is taken by the regional offices. As such, it does not get publicity. TFC management has expressed interest in participating in the ESD, possibly with a private SHS vendor in the initial stages. However, developments have been slow.

In general, the lending culture of TFC is urban oriented. This needs to change if TFC or any other finance company is to embark on a larger scale SHS lending program. The urban lending culture does not take into consideration the rural culture where defaulting debt, in properly administered programs is a social stigma.

Once again, as awareness of SHS increases with the ESD campaign, more interest maybe forthcoming from TFC management as well as others.

#### **f) Private Consortiums**

As opportunities arise both in the market place and with finance availability, SHS is getting more attention of larger conglomerates that operate in Sri Lanka. These companies are diverse in their activities from being involved in consumer electronics, tourism to plantations. Interest has been expressed by such entities looking to link up with finance companies within the group or out side to develop the SHS market. In some cases there is interest from international solar PV companies to link with these larger companies to develop the local market. Tata BP Solar of India is one such company.

Even though these organization have wide resource bases in terms of both financial and human capital, they have very little knowledge of doing business in remote rural areas. For many, it is yet not very clear that, SHS customers are typically many more kilometers away from even the village center.

This interest has not turned into action as yet. However, the ESD awareness campaign may provide more incentive for these companies to explore the both the possibilities and challenges more closely.

#### **g) Participating Credit Institutions (PCIs)**

According to the established procedures for the ESD, PCIs cannot act as project developers (PD). In effect, if they lend directly to SHS customers, they would become a PD.

As some of the PCIs such as the Hatton National Bank has existing rural credit programs, it would be natural to channel ESD funds directly to SHS customers.

In this case, Hatton National Bank has started to lend directly to SHS customers, with a SHS vendor supporting the marketing and technical side of the operation.

For instance, the vendor, Solar Power & Light has identified many interested SHS customers from an area in proximity to a HNB branch. HNB has agreed to lend to 10 customers as a pilot. The potential customers have to

be a HNB customer or open an account with the branch. Then the bank, after doing the necessary credit evaluation, finances 70% of the SHS cost of qualified customers.

The ESD project's US \$ 100 grant per system provided by GEF will be passed onto the customer. However, it is proposed that this amount be held in the Hatton National Bank branch in the customer's account until the loan repayment is complete. This amount gives the bank some financial guarantee, as well it acts as an incentive for the customer to pay the loan. Having this amount at the end of 3 years is a bonus for the customer as part of it could be used to replace the existing battery. The other option is to discount the capital cost of the SHS by US \$ 100 in the first place.

Further, the Hatton National Bank has secured a guarantee from Solar Power & Light which ensures that the PV module will be repurchased by the company in the event of a customer default.

The above scenario, shows that commercial banks are moving forward, even if it is with a lot of caution.

As the program evolves and if it is successful, the Hatton National Bank may increase its exposure and other private vendors will be able to work in partnership to increase the SHS market.

### **3. The Future of the SHS Financing**

The above activities clearly show that the financing of SHS is well on its way. However, there is yet more confidence building of the financing community that is required, if the lending levels are going to be increased to the 1000s of SHS instead of the current few hundreds.

A few interesting models are also emerging as the existing rural lending programs are moving towards SHS lending. With the distinct differences between rural and urban lending cultures, it is easier for these grass roots level organizations to extend credit for SHS rather than getting the mainstream commercial lenders and private companies to operate.

*However, SHS marketing programs have other implications that complicate the process. They include:*

- ensuring the SHS hardware meets certain quality standards to ensure effective operation
- ensuring the installation is done to meet standards
- training the customer to manage the system and do simple maintenance
- providing customer support services and making parts such as bulbs available
- having infrastructure to collect the monthly payment

These additional activities, most of which are highly technical in nature require the organization to learn a new discipline. For an organization specializing in rural lending, this could be a challenge.

That is where *strategic alliances* have to be formed between specialists in the technology (such as SHS vendors) and rural level organizations.

### **Conclusion**

The ESD in Sri Lanka has changed the balance of the equation for SHS dissemination with the availability project financing. As a such a major barrier has been lifted. However, in the process of moving this fund through the channels to SHS customers, there are yet many barriers left. This is to do with the intermediaries such as the commercial banks (the PCIs) not being in the comfort zone yet, when it comes to lending in rural areas and with the Solar PV as a technology. This is bound to change with time, as more and more ESD loans are taken, SHS installed and most importantly, the PCIs are repaid by the project developers.

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